

Gather Tools and Wireless Equipment

Building + Mounting

Introduction

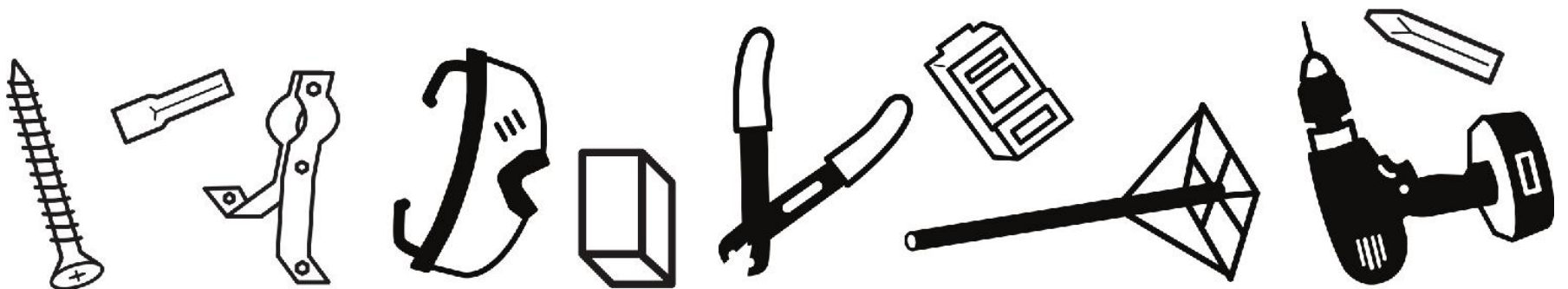
In this module you will find a list of suggested tools and equipment for wireless installations. It includes many common hand and power tools that you or someone you know may already have, so do not feel that you have to purchase all of these! Some items are also listed as optional — these may make some installations easier, but are not required. There is also a list of some wireless routers and mounting kits, but you should pick one based on the specific installation you are performing.

How to use this module: Read through the material and determine if you need to purchase any tools, hardware or equipment. This should

take less than an hour. Finding some of the items may take some more time. We have included specific part numbers for some harder-to-find items, but keep in mind items are occasionally discontinued or renumbered.


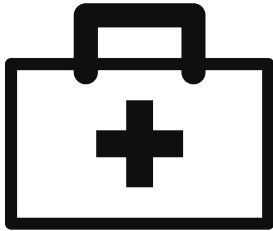
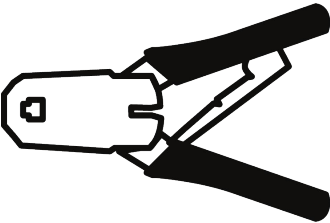


This module should be considered a companion to [Prep and Install Rooftop Nodes](#), [Learn about Rooftop Mounts](#), and [Learn Rooftop Basics](#). There are many references in those documents to tools and equipment in this module.

Time required: less than 1 hour.


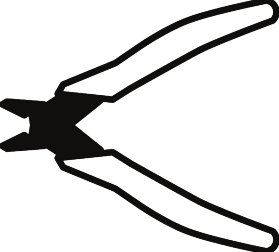



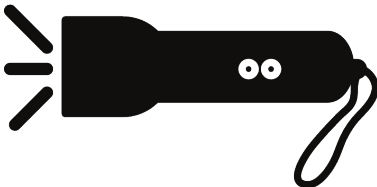


Tool Bag


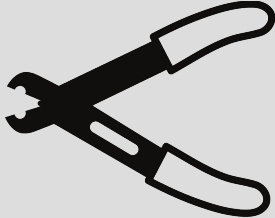
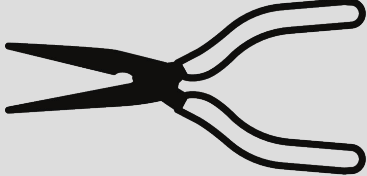
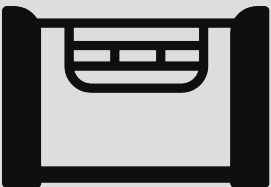
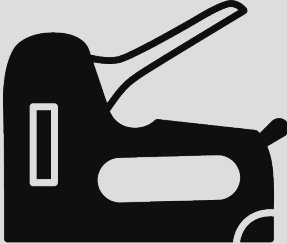
Everything below is recommended for your tool bag, but shaded items are optional — you may not need them for your specific installation.

Item		Detail	Price
	Tool bag	Any 18" tool bag should be large enough.	\$45
	First Aid Kit	Any compact, portable first aid kit.	\$30
	Ethernet Crimper	EZ-RJPRO from Platinum Tools	\$75
	6-in-1 Screwdriver		\$10
	8" Adjustable box wrench		\$10

Tool Bag, continued

Item	Detail	Price
	Utility knife (box cutter)	\$5
	Edge cutters	\$10
	Measuring tape	\$10
	Eye protection glasses	\$5
	Ear plugs	\$2
	Flashlight or Headlamp	\$15

Tool Bag, continued.

Item		Detail	Price
	Cable stripper	CAT5 cable jacket stripper, part # 15015	\$14
	Wire stripper		\$10
	8" Needle-nose pliers		\$10
	Small magnetic level		\$10
	Cable tacker staple gun	Arrow Fastener T59 Wiring Tacker	\$40
Subtotal for hand tools:			\$301

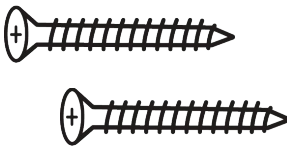
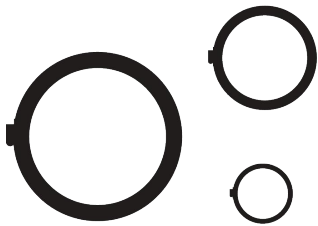
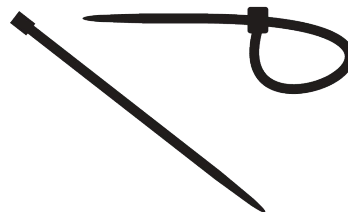
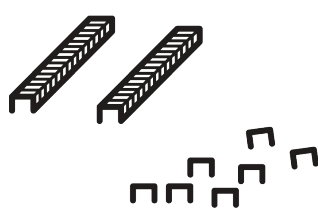
Drilling Tools

Often cables must be run through masonry or brick walls, and mounting hardware must be installed on outdoor masonry walls. **Shaded items are optional.**

Item	Detail	Price
	Hammer drill (corded) Standard corded drill with "hammer" option. Less expensive than cordless.	\$70
	Masonry drill bits For concrete, brick, or stone (Note: not SDS bits)	\$20
	Regular drill bits Any set of wood and metal drill bits.	\$15
	Heavy-duty driver bits Standard flat head and Phillips driver bits.	\$5
	Hammer drill (cordless) 18V cordless or higher power recommended. More expensive option.	\$200
	12" or longer masonry bit 1/2" bit for thick walls - rated for concrete, brick, or stone. (Note: not SDS bit)	\$10
Subtotal for drilling tools:		\$320

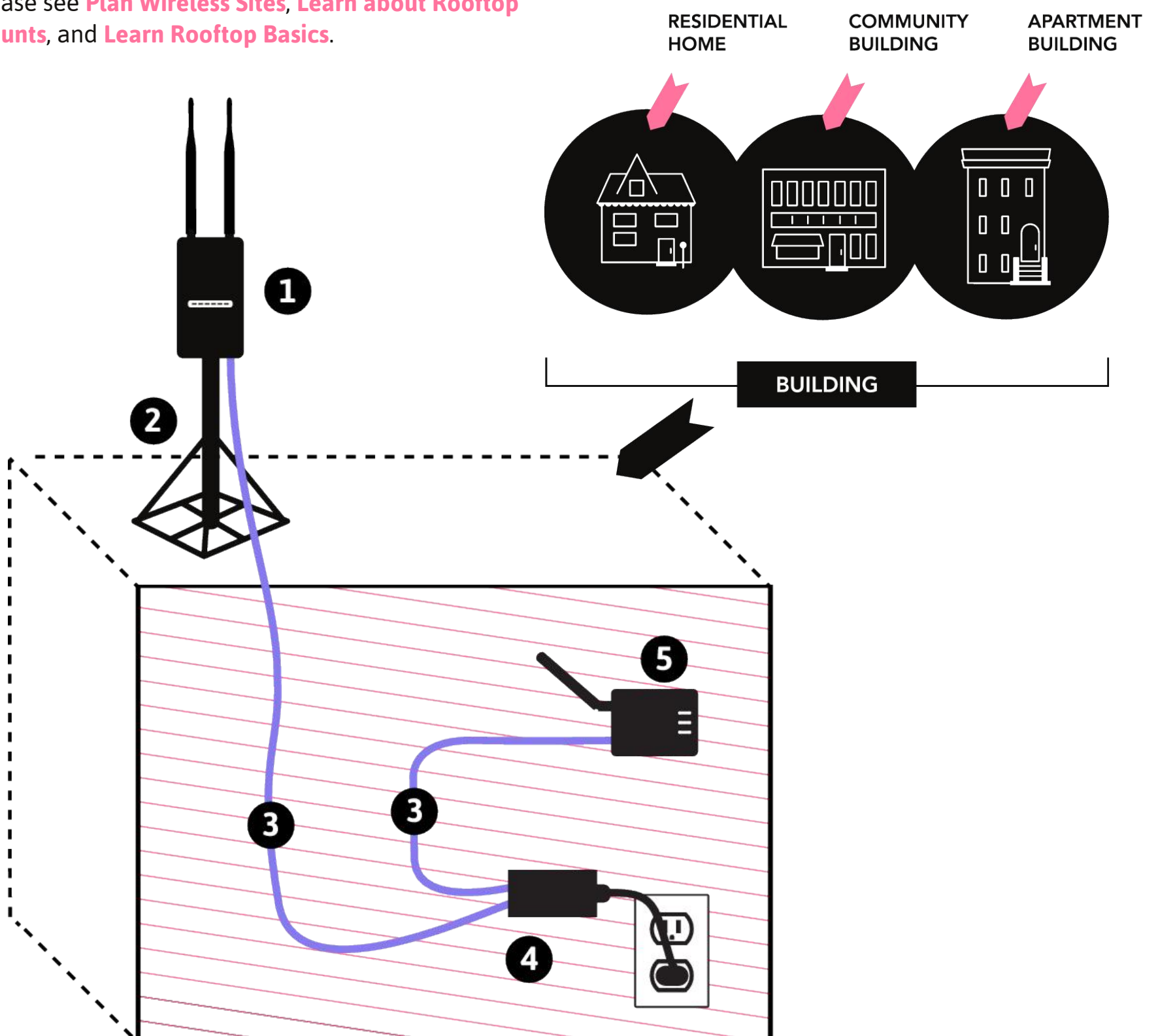
Consumables

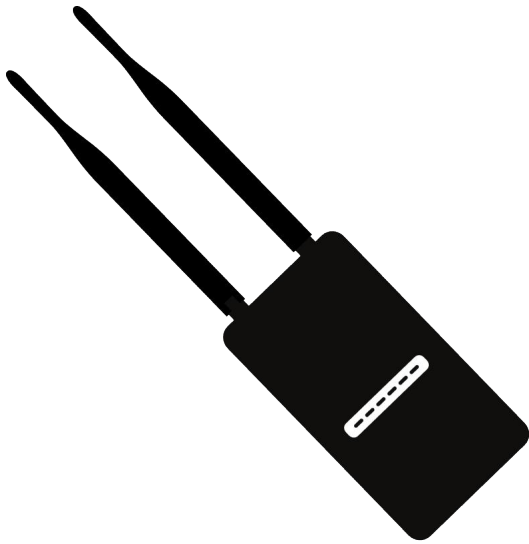
These items are used to attach or fasten equipment or cabling in place. You will use them up as time goes on, and will need to purchase more.

Item	Detail	Price
 Masonry screws	Get a box of 50 for about \$15 or \$20 - plan on losing some screws.	\$20
 2" Hose clamps	To attach routers to masts.	\$5
 Zip ties	Sets of 6" and 12" UV-rated ties.	\$25
 Cable tacker staples	Arrow Fastener 591189 - 5/16" insulated staples.	\$10
Subtotal for consumables:		\$60

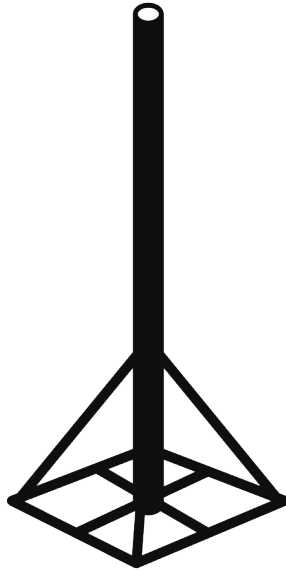
Wireless Equipment

The next section details different types of wireless equipment and the mounting hardware you can use to attach it to the roof of a building. The diagram below shows how all the various elements go together, but for determining what equipment and mounts are best for a specific home or building, please see [Plan Wireless Sites](#), [Learn about Rooftop Mounts](#), and [Learn Rooftop Basics](#).



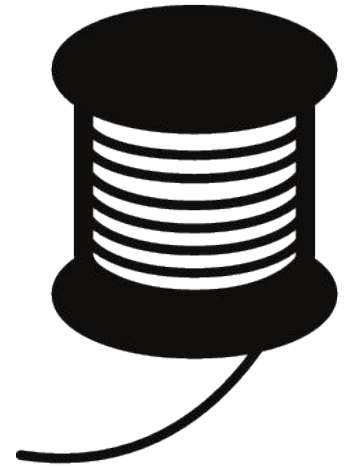


1. Wireless Router (Node)



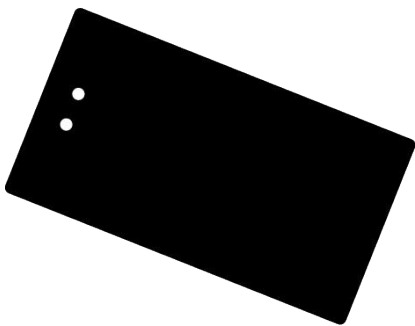
2. Roof Mount

For specific hardware, consult the [Learn About Rooftop Mounts](#) document.



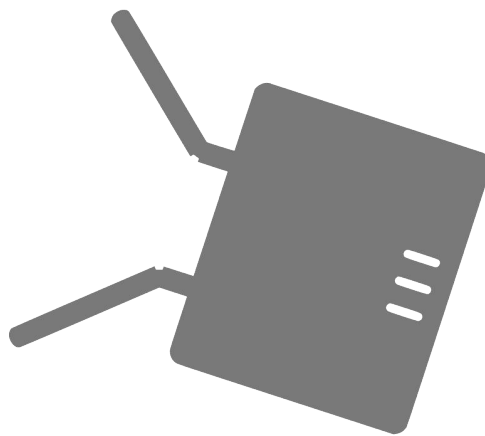
3. Ethernet Cable

A spool of 1000 feet is about \$150. A single install may use 50 to 100 feet of cable.



4. PoE (Power over Ethernet) Adapter

This should come with an outdoor router.



5. Indoor Router (optional)

This provides indoor wireless coverage. Some buildings and homes may have these already.



There are two possible ways to connect this router to the Internet:

If the Commotion node is plugged-in to the router's LAN (inside network) port, and there is a modem or connection to the Internet plugged in to the WAN port, an Internet connection will be shared to the neighborhood mesh.

If the Commotion node is plugged-in to the router's WAN (Internet) port, the connection to the Internet will be provided by the neighborhood mesh. This requires your neighbors to be donating one or more connections to the mesh. If there is no connection to the Internet, you can use the network as a local "Intranet," or local network.


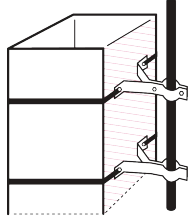
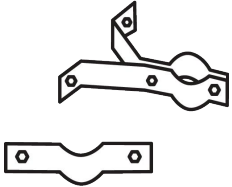
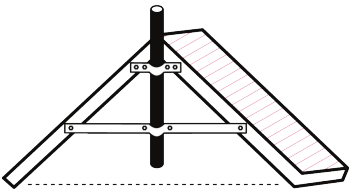
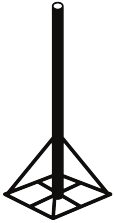


Wireless Equipment

For a standard installation, select one of the Ubiquiti routers per site. Add an indoor router to extend coverage inside the building. Estimate the number of feet of cabling to connect the routers to each other and the Ubiquiti router to the power source, with two RJ-45 ends per cable (plus some extra, just in case).

Item		Detail	Price
	Short range, omnidirectional router	Ubiquiti Rocket M2 or M5 with generic dipole antennas	\$100
	Medium range, directional router	Ubiquiti NanoStation M2 or M5	\$90
	Long range, high power router with antenna options	Ubiquiti Rocket M2 or M5 with high-power omnidirectional antennas or very focused dish antennas	\$250
	RJ-45 connectors	Shielded CAT5e or CAT6 connectors - Ubiquiti TC-CON-100	\$55
	Spool of Ethernet cable (shielded)	Outdoor rated CAT5e, 1000 feet - Ubiquiti TC-PRO	\$150
	Basic indoor router	TP-Link WDR3600 or WR842ND	\$50
Subtotal for wireless, per installation:			\$100-\$300

Mounting Hardware

Typically you will need one mast, two hose clamps, and one mounting kit per building that has exterior equipment. For more information on specific types of mounts, please see [Learn about Rooftop Mounts](#).

Item	Detail	Price
	5' steel mast or pipe Radio Shack - Antennacraft 5' 18-gauge mast.	\$15
	Chimney mount kit Winegard CM-2012 kit (wraps around chimney - no drilling)	\$20
	Wall mount kit Channel Master CM-9034 (requires drilling holes and using masonry screws)	\$20
	Eaves mounting kit Winegard SW-0012 (for the edge of a peaked roof)	\$30
	Non-penetrating rooftop mount VMP FRM-125 (for flat roofs only)	\$105
	Rubber mat NPRMAT8 - protects roof under the non-penetrating mount.	\$10
	Concrete blocks Required as ballast for non-penetrating mount.	\$10
Subtotal for hardware, per installation:		\$35-\$125

Definitions

PoE: Power over Ethernet. Systems which pass electrical power along with data on Ethernet cabling.

LAN: Local Area Network. In this case, a computer network covering a small local area, such as a home or office with Ethernet cables or wireless signals.

WAN: Wide Area Network. In this case, this signifies the connection to the global Internet.

Related Information

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